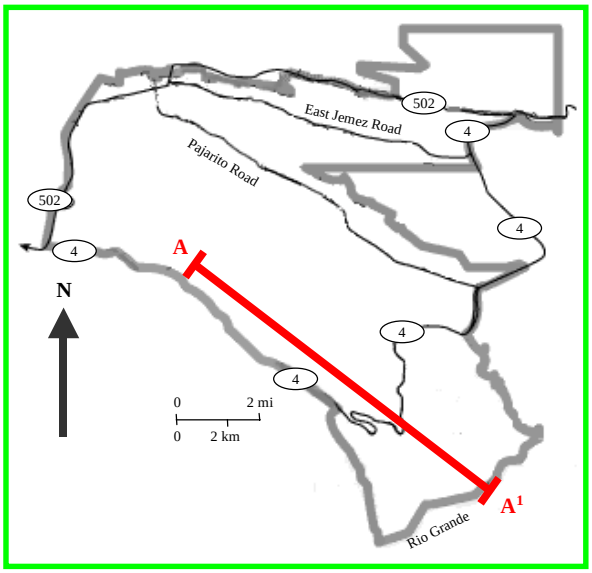
Vadose Zone Fact Sheet
Los Alamos National Laboratory

Background: Los Alamos National Laboratory (LANL) is located predominantly in Los Alamos County, north-central New Mexico, approximately 96 km (60 mi) north-northeast of Albuquerque and 40 km (25 mi) northwest of Santa Fe. The 111.8 km^2 (43 mi^2) Laboratory is a multidisciplinary research facility.



Issues: Vadose zone exposure pathways to receptors are minimal.

Vadose zone infiltration: There is a high volume of vadose infiltration to the alluvial and perched zones. The alluvial and perched zones may be minor sources of recharge to the regional aquifer.

Vadose zone characterization/remediation: Laboratory sites on the mesa tops have released contaminants into the vadose zone, and vapor transport of the contaminants has been documented. Fractures in the vadose zone may provide a migration pathway where they either receive large volumes of water that mobilize the contaminants or produce gaseous by-products that transport contaminants via the vapor phase. Vadose zone contamination serves as secondary sources of contamination.

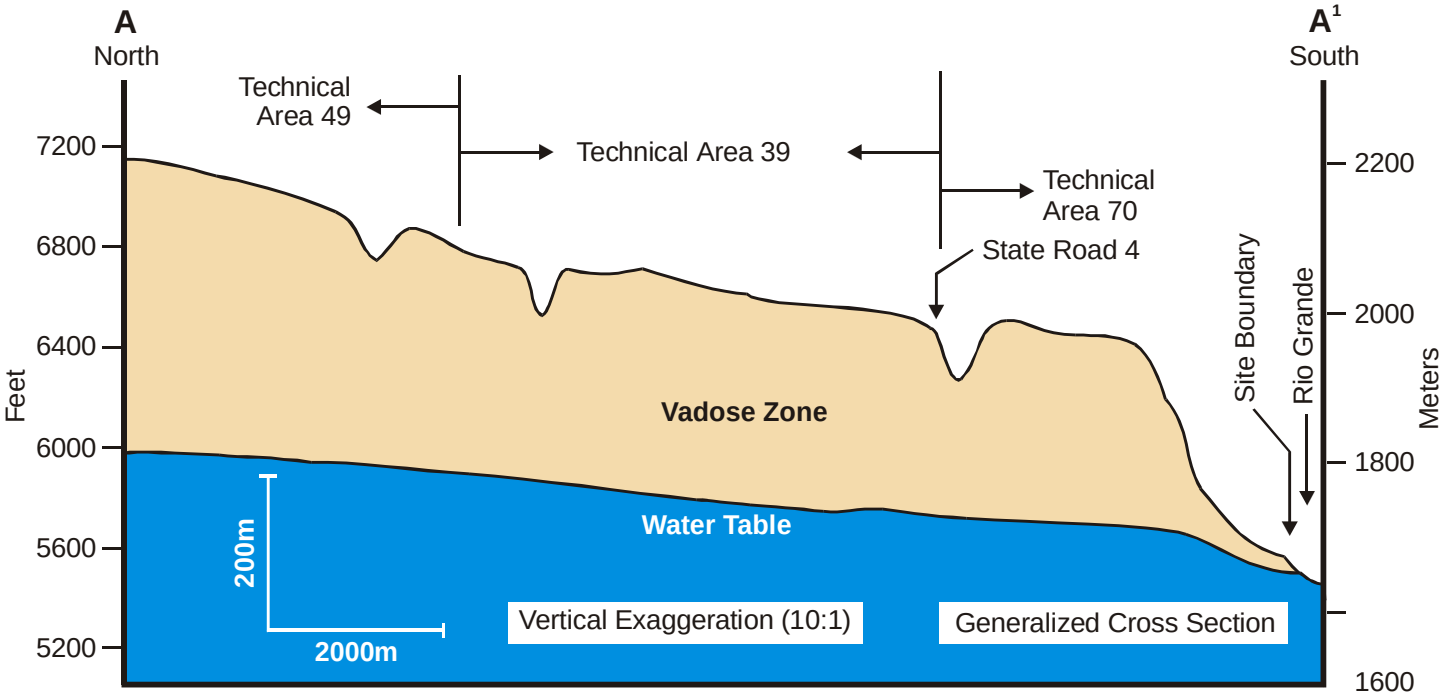
Precipitation: Semi-arid, temperate mountain climate. Precipitation is variable, ranging from 25 to 51 cm (10 to 20 in) per year.

Surface waters: The major surface water drainage includes ephemeral, intermittent, and perennial reaches of surface water; wastewater created reaches; and springs. All surface water drainage and ground water discharge ultimately arrives at the Rio Grande.

Geology: LANL is situated on the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons. Mesa tops range in elevation from approximately 2,379 m (7,800 ft) on the flank of the Jemez Mountains to approximately 1,891 m (6,200 ft) at their eastern termination above the Rio Grande. The eastern margin of the plateau stands 91 to 274 m (300 to 900 ft) above the Rio Grande. Soil and alluvium up to 30 m (100 ft) thick overlie predominantly volcanic bedrock.

Vadose zone thickness: Depth to the regional aquifer ranges from 0 m at springs near the Rio Grande to 183 m (600 ft) in the higher elevations.

Major contaminants of concern: Tritium, plutonium, americium, uranium, strontium-90, cesium-137, high explosives.



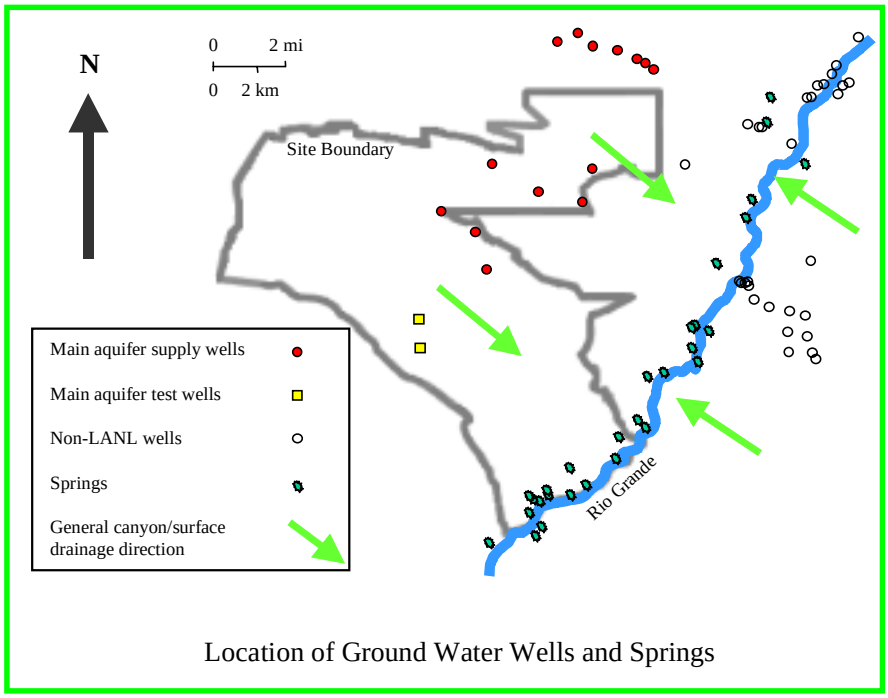
September 2000

Ground Water Fact Sheet
Los Alamos National Laboratory

Background: Los Alamos National Laboratory (LANL) is located predominantly in Los Alamos County, north-central New Mexico, approximately 96 km (60 mi) north-northeast of Albuquerque and 40 km (25 mi) northwest of Santa Fe. The 111.8 km^2 (43 mi^2) Laboratory is a multidisciplinary research facility.

Hydrogeology: Subsurface water occurs in three modes in the Los Alamos area: 1) shallow alluvium and underlying bedrock, 2) intermediate perched zones, and 3) the regional aquifer. Ephemeral runoff temporally saturates the shallow alluvium and underlying bedrock in some of the larger canyons. Several perched aquifers are present, but it is not known if they are hydraulically connected. Flow rates in the regional aquifer range from 6 to 105 m (20 to 345 ft) per year. The ground water movement is east to southeast towards the Rio Grande.

Issues: Los Alamos has implemented ground-water monitoring programs to identify releases that could pose a health risk to surrounding communities. The site landlord, Defense Programs, operates this surveillance and monitoring program. The monitoring data gathered so far indicates that risks are minimal to the health and safety of the public.



Location of Ground Water Wells and Springs

Ground water characterization/remediation: LANL is in the process of characterizing potentially contaminated ground water and developing conceptual models of the hydrogeologic setting. If present, Laboratory-derived contaminant concentrations in the regional aquifer are probably below maximum contaminant levels (MCL) for drinking water because 1) regional aquifer underflow dilutes contaminant concentrations in recharge and 2) contaminant concentrations in alluvial and intermediate perched zones are expected to decrease with depth due to dilution and geochemical attenuation along vertical migration pathways. No ground water plumes have been delineated, and contamination in the regional aquifer is minimal to non-existent. There are many on- and off-site wells currently being sampled, and several new test wells have been proposed to confirm hydrogeologic models and to ensure protection of the regional aquifer. One ground water plume has been identified in Technical Area 16 (TA-16), but the extent of the plume has not been determined.

Ground water use: The regional aquifer is a large-scale municipal water source that is used by the Laboratory and local communities.

Plume	Primary Contaminants	Remedial Approach
TA-16	High explosives	Monitoring; institutional controls